



Laser-Cut Book Covers

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TOOLS:

- [Clear varnish \(1\)](#)
- [Laser cutter \(1\)](#)
If you don't own one, check your local fab lab, hackerspace, TechShop, or a commercial laser-cutting service.
- [Sandpaper \(1\)](#)
- [Wood glue \(1\)](#)



PARTS:

- [Plywood \(1\)](#)
Birch works best.
- [Rubber band \(1\)](#)
- [Notepad \(1\)](#)

SUMMARY

We made wooden booklets, each with a hinge and a notepad holder. The hinge can be fully bent in both directions repeatedly without breaking. How is that possible? First, wood has the strength to withstand repetitive bending and twisting. It won't break as long as the stresses stay under a certain limit.

The trick to making the wood flexible is to break it up in a lot of small pieces that can all twist a little. All these tiny twists add up so you can bend the sheet without stressing the material too much.

Imagine it like this: when you twist a matchstick with your hands, you can twist it maybe 1/8 of a turn before it breaks. Imagine now you have a matchstick 10 times longer. You can twist it 10 times as far, more than a full turn. That's how the hinge we use here works. When you look closely you can see that the cuts leave a pattern of interconnected small "sticks." When you bend the cover, you'll see them all twisting a little bit.

There are several patterns that will allow bending. The simplest one is a set of shifted cuts. The longer or wider you make the piece, the softer it gets. This pattern yields a very springy hinge that you can move in all directions.

To make the hinge stronger, you can add some tabs in each line. This gives the hinge a lot more strength while still allowing you to bend it.

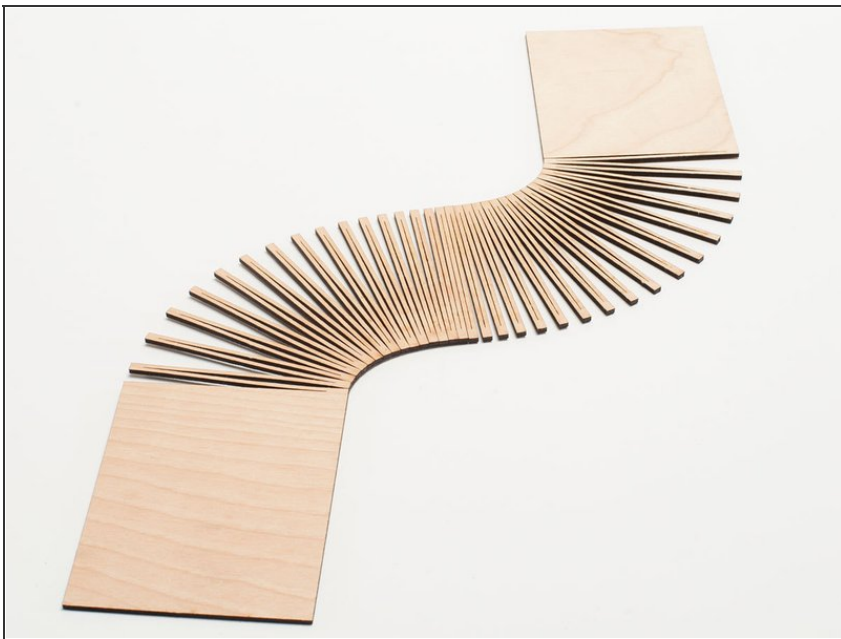
Inside the cover is a clamp that holds the notepad with two flexible “arms,” cut so they're slightly smaller than the notepad. When you insert the notepad, the arms press on the sides, keeping it firmly in place.

Step 1 — Download the DXF Files.



- Download the files from Thingiverse (<http://thingiverse.com/thing:12707>). Load up your plywood, then send the files to the laser cutter.

Step 2 — Sand the pieces.



- When the pieces are ready, sand them to get rid of the laser-cutting marks.

Step 3 — Varnish the pieces.



- Varnish both pieces to protect them from dirt. Set aside to dry.

Step 4 — Put it together.



- When dry, apply wood glue to the back of the clamp's middle section and position it on the inside of the cover. Take care not to put glue under the ribbed “arms” of the clamp because these need to move freely. Put some weight on the clamp and wait 2 hours for the glue to dry.

Step 5 — Insert the notepad.



- Carefully insert the notepad in the clamp, insert the rubber band in the 2 slots at the bottom, and you're done!

Step 6 — Mod It!



- Once you've downloaded the DXF files, there's nothing stopping you from altering them to fit your own needs. Go ahead and change the shape to your liking, or laser cut your name onto it. You can also extract the hinge and use it in other projects that need some bent wood. Happy making and don't forget to share your work!

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